UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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SUBJECT St Joe Mineral's Agreement with MDNR on Liability and Remedial Action for Lead Mine Tailings Site at Desloge, Missouri

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This memo summarizes developments with the abandoned lead mine tailings site at Desloge, Missouri and reviews the agreement between St Joe Minerals Corporation, Missouri Department of Natural Resources and other agencies to clean-up/stabilize the site The initial review was by Paul Doherty with additional review by myself

I Background

Lead mine tailings were deposited at the Desloge, Missouri site by St Joe Minerals Corporation for 29 years, between 1929 and 1958 The site covers approximately 500 acres The tailings are reportedly 2 - 4 percent lead and are piled to depths of up to 100 feet inside a horseshoe bend of the Big River

In 1972, the property was donated by St Joe Minerals to St Francois County The County in turn donated the land to the St Francois County Environmental Corporation, a non-profit organization for the purpose of establishing a sanitary landfill on the site Up to this time it is reported that the tailings site had been adequately maintained with no apparent incidents of tailing pile washout or erosion into the Big River

In 1977, a major washout occurred, reportedly as a result of a blocked drainage structure and neglected maintenance It is estimated that up to 50,000 cubic yards of lead tailings washed into the Big River Minor erosion has continued up to the present time adding to the tailings deposited in the River

Following the washout incident, several studies were undertaken to assess the extent of environmental damage and explore remedial action alternatives

In late 1977, EPA/SVAN conducted an intensive survey of the Big River The general finding was that the Big River was degraded by mine tailings, mainly as a result of physical changes rather than toxicity It is reported that mine tailing deposits are the primary constituent of the stream bed for several miles downstream of the tailings pile

In June 1979, a study was initiated by the University of Missouri to evaluate the present and potential problems of the site and to propose solutions to these problems Their report was issued in January 1980

A July 18, 1980, study by the Missouri Department of Conservation reported elevated levels of lead in the flesh of sucker fish downstream from the tailings pile As a result of these findings the Missouri Department of Health issued a warning to the public against eating bottom feeding fish in this area

Since the occurrence of the washout incident a number of meetings have been held among interested agencies to coordinate mitigation efforts Up until last year, enforcement action against St Joe Minerals was considered as the most likely course of action by several of these agencies The Corps of Engineers (COE) referred the case to the Department of Justice (DOJ) in late 1978 To date, no action has been taken by the DOJ on this referral In 1980, the recommendation from EPA/ENFC called for immediate enforcement action under Section 311 of the CWA and Section 7003 of RCRA The site was recommended for listing as an uncontrolled site by EPA, COE, and the Department of the Interior for potential Superfund action

In late 1980, MDNR began negotiating with St Joe Mineral Corporation for voluntary clean-up of the mine tailing site As a result of these negotiations, and the fact that mining waste became excluded from the hazardous waste regulation (November 19, 1980), the Regional Office agreed to suspend further enforcement actions until the results of these negotiations became known The Agency also agreed, at the request of MDNR, to drop the Desloge Lead Mine Tailings Site from the list of uncontrolled sites The negotiations continued from late 1980, until August 1981 It is understood that the principle stumbling blocks to negotiating the final agreement were

1 Reconciliation of St Joe Minerals' past and future liability for the site, and

2 Assigning responsibility for future site maintenance

The final negotiated agreement, "Covenant Not to Sue" between the St Joe Minerals Company, St Francois Environmental Corporation, State Department of Natural Resources, State Clean Water Commission, State Conservation Commission, and State Attorney General's Office was signed on September 4, 1981

II The Agreement

The format of the Agreement, titled Covenant Not to Sue" is in three basic parts These parts can be described as

1 Summary statements on the history of the site and washout incident,

2 Statements of liability, responsibility and exemption from future litigation, and

3 Description of remedial action work

The first several provisions of the Covenant set forth the history of the site and washout incident as described previously in this memo

The succeeding provisions set forth the conditions of liability, future litigation and remedial action responsibilities According to these provisions, St Joe Minerals and the St Francois County Environmental Corporation are released from responsibility for all damage, past and future, resulting from the washout incident The St Francois County Environmental Corporation assumes responsibility for contracting all agreed-upon remedial action work and assumes responsibility for future maintenance of the area The St Joe Minerals Corporation agrees to pay for the proposed work, provide supplemental fill material for reconstructing containment dams, and will provide advisory technical assistance to the St Francois County Environmental Corporation with the review and inspection of the construction work performed No responsibility for the work is assumed by St Joe Mineral with this advisory role

The third part of the Agreement provides specific details on the remedial action tasks This work is described in a document titled, Repair of Damage at Desloge Landfill Along Big River, and has been made part of the Covenant by reference

The work can be briefly summarized as follows

1 Fill-in/repair of all major erosion gaps (two large gaps and three smaller gaps)

2 Reconstruction of three retaining berms at the repaired erosion areas,

3 Alteration of the failed drainage structure to prevent future blockage problems,

4 Seeding and fertilizer application to a 20 acre "demonstration plot, and

5 Construction of all necessary haulage roads

III Discussion

Although the entire Repair of Damage at Desloge Landfill Along Big River document was not submitted to the Agency for review (drawings and photograph exhibits were omitted), the description of work is consistent with recommendations made in the 1980 report prepared by the University of Missouri for MDNR It appears that the agreed-upon work is a middle ground response to the University of Missouri report recommendations The major structural failures on the site will be remedied by the proposed work and this will eliminate much of the environmental hazards posed by future erosion or washouts at the site The University of Missouri performed extensive analyses on the engineering properties of the tailings material With certain exceptions (i e , areas where remedial work is planned) the report concluded that the tailing pile site as a whole appears to be stable

The proposed work does not address several existing or potential environmental hazards identified in the University of Missouri's report and other agency memoranda These potential environmental hazards are discussed briefly as follows

1 Contamination of Big River Benthic Zone and Fish Population Studies conducted by EPA and MDNR have documented that the Big River has been degraded for several miles downstream from the tailing site and that bottom feeding fish have elevated levels of lead in their flesh Both situations warrant concern from an environmental standpoint However, reclamation or dredging of the river is not included in the Agreement's scope of work Omitting this work from the Agreement appears justified It would be unreasonable to expect St Joe Mineral to assume responsibility for a major dredging operation resulting from a washout incident which had occurred several years after the Company relinquished title (and responsibility) of the property to the County The State Department of Conservation and MDNR believe that a dredging operation would completely destroy the ecology of the river and that natural processes would be more effective in reclaiming the river given time

On the other hand, the Corps of Engineers and Department of Interior support a dredging operation and believe that the river bottom lead deposits pose a significant environmental hazard Both agencies initially favored listing the Big River Site as an uncontrolled site, eligible for Superfund action However, mining wastes are now excluded from Superfund Based on a review of the available information, the position of the MDNR appears to be a reasonable approach There have been no known reports of contaminated water supplies The local population has been discouraged from eating sucker fish caught in the area and as long as reasonable dietary precautions are taken health problems should not develop

2 Leachate Contamination (Heavy Metals) from the Sanitary Landfill The study conducted by the University of Missouri reported that liquid leachate from the landfill operation could lead to potentially serious contamination of water supplies Their laboratory studies, conducted with mine tailing material, showed that under acidic conditions, lead and zinc in the tailings can become soluble, migrate with leaching water flows and could eventually contaminate surface and groundwater supplies The report viewed the hazard of heavy metal leaching to be serious enough for MDNR to establish an immediate monitoring program In March 1980, following the University of Missouri report, MDNR did perform some leachate monitoring at the site Their results showed that the levels of lead, zinc and cadmium were not elevated above background levels nor did they exceed USPHS drinking water standards ENFC/LEGL has questioned whether the samples analyzed by MDNR are representative of the Desloge landfill leachate We concur that the question of landfill leachate mobilizing heavy metals, particularly lead, has not been answered to date We recommend that a study be initiated to determine if the landfill leachate mobilizes heavy metals, in particular lead The Bureau of Mines is conducting a study on the lead tailings They should be contacted for background iformation and coordination for any additional studies in the area Alternately, appropriately placed monitoring wells should be installed at the landfill with analysis to include lead and leachate parameters

The landfill situation does warrant the future attention of MDNR Periodic monitoring of leachate samples by MDNR should continue and appropriate actions taken if a problem develops MDNR and the State Conservation Commission have been accorded the right of access for inspection purposes in the Agreement Monitoring and inspections are necessary

3 Site Stabilization, Revegetation and Hazards of Airborne Lead Dust The University of Missouri report concluded that the Desloge lead tailing pile will remain a potential health hazard due to blowing of lead laden dust and the potential for further erosion until such time as the site is completely stabilized by vegetative growth Because of problems with seed germination, moisture retention and fertilization, revegetation of the site will not occur through natural processes Although the Agreement provides for seeding and fertilizer application to 20 acres of land, this seeding operation will involve less than 5 percent of the tailing site It is understood that the seeded/fertilized plot may serve as a demonstration study to assess plant supporting characteristics of the tailing pile and that this study would provide the basis for future seeding and fertilization The Agreement is not specific on who, if anyone, is responsible for maintaining or evaluating the 20 acre demonstration plot

Revegetation of 20 acres still leaves over 95 percent of the Desloge site without plant cover Questions have been raised as to whether the potential for windblown lead dust at the abandoned lead tailing site represents a significant environmental hazard In the absence of specific air monitoring data it is difficult to accurately assess the hazards posed by this exposure route A brief review of the available literature indicates that the environmental hazards associated with inhalation of lead and lead compounds during lead ore mining, crushing and milling operations is low The NIOSH development document for Criteria for a Recommended Standard for Occupational Exposure to Inorganic Lead (1978) provides a general overview of the degrees of occupational exposure to lead for 34 industrial operations Lead mining is not mentioned in this overview, suggesting that the hazards of occupational exposure may not be significant

The EPA publication Air Quality Criteria for Lead (EPA 600/8-77-017) states

> Exposures for workers involved in lead mining depend to some extent on the solubility of the lead from the ores The lead sulfide (PbS) in galena is insoluble, and absorption through the lung may be slight It is not really known how readily absorption takes place In the stomach, however, some lead sulfide may be converted to slightly soluble lead chloride, which may then be absorbed in moderate amounts

Although occupational exposure to atmospheric lead is discussed in some detail in this publication, no further reference to lead mining exposure hazards is provided

Lead toxicity is mainly the result of the concentration of diffusable (soluble) lead in soft tissues of the body The insolubility of lead sulfide (galena) probably accounts for its low reported toxicity The Registry of the Toxic Effects of Chemical Substances states that lead sulfide presents an insignificant hazard with regard to aquatic toxicity This is the lowest possible rating The low toxicity rating may also explain the lack of toxic reactions observed by EPA in the Big River following the washout incident

The Mine Safety and Health Administration (MSHA) is responsible for establishing and enforcing standards for occupational exposure to lead during mining operations The standard is 0 15 mg/m^3 of lead and lead compounds Mr Terry Phillips, Sub-district Manager of the MSHA Rolla, Missouri office states that compliance measurements for this standard are usually collected near the ore concentration operation Although this operation produces a concentrate which is 98 - 99 percent lead sulfide, compliance with the 0 15 mg/m^3 standard is not unusually difficult Given that the lead tailings are 2 - 4 percent lead, Mr Phillips did not believe that the abandoned tailing pile would violate their standard of 0 15 mg/m^3 Short-term violations may occur during periods of high winds but one would expect that due to the high density particulate nature of lead dust only the area immediately adjacent to and downwind from the site would be impacted Due to the low toxicity of lead sulfide, the low concentration of lead in the tailing pile and the intermittent nature of windblown occurrences, it is concluded that the environmental hazards posed by windblown tailing dust is not siguificant It may be advisable to establish ambient air quality monitoring stations near the site to confirm this conclusion

IV Summary

The Agreement (Covenant Not to Sue) between St Joe Minerals Corporation, MDNR and interested agencies is a reasonable negotiated settlement to clean-up and remedy a tailing pile washout incident for which no party is clearly responsible The proposed remedial work will stabilize the site to prevent future washout problems but does not address other environmental concerns regarding

1 Tailings in the Big River sediment,

2 Potential leachate contamination from the landfill operation, and

3 The lack of a vegetative cover to further stabilize the site

4 Erosion control on a continuing basis

5 Long-term sampling/environmental evaluation program

Overall the Agreement addresses landfill dam repairs but did not include the above listed concerns as applicable The fact that lead concentrations in bottom feeding fish is high enough that the State issued a warning against their consumption is evidence to support a Federal action under §7003 of RCRA For this reason and because the above listed concerns are not addressed in the Agreement, EPA should continue to monitor the progress of the State It is recommended that we issue a letter to MDNR expressing our concerns and recommended actions they should undertake to address these